REMARKS

Claims 1-8 are pending in this application. By this Amendment, claims 1 and 2 are amended to address formality issues. Claim 1 is also amended to further distinguish over the reference cited in the Office Action.

No new matter is added by this Amendment. Support for the language added to claim 1 can be found throughout the specification at, for example, page 18, lines 1-5.

Reconsideration of the application is respectfully requested.

I. Claim Objection

In the Office Action, the Patent Office objected to claim 1 for allegedly failing to conform with current U.S. practice and containing grammatical and idiomatic errors. This objection is respectfully traversed.

Claims 1 and 2 are amended to correct any alleged grammatical and idiomatic errors and place the claims in conformity with current U.S. practice. Specifically, claims 1 and 2 are amended to insert the word "of" after occurrences of the word "step" within the claims as suggested by the Patent Office. It is respectfully submitted that the objection should be withdrawn.

II. Rejection under 35 U.S.C. §103(a)

Claim 1 was rejected under 35 U.S.C. §103(a) as allegedly being unpatentable over U.S. Patent No. 6,191,007 to Matsui et al. This rejection is respectfully traversed.

Applicants submit that Matsui et al. fails to teach or suggest a method of fabricating an SOI wafer in which the steps are conducted such that the separation results in a separation surface of the bonded silicon single crystal film having a roughness (Rms) of 4.5 nm or less, for example by conducting the process using a dose of the ion implantation that is set smaller as the depth of formation of the separatory ion implanted layer measured from the ion implantation surface becomes smaller as recited in claim 1.

The Patent Office acknowledges that Matsui et al. fails to teach that the dose of the ion implantation is set smaller as the depth of formation of the separatory ion implanted layer measured from the ion implantation surface becomes smaller. However, the Patent Office alleges that it would have been an obvious matter of design choice and that Applicants have not disclosed that the dimensions are for a particular unobvious purpose, produce an unexpected result or are otherwise critical.

At page 3, lines 17-25 of the present application, Applicants disclose:

> On the other hand, it has generally been believed that hydrogen must be implanted to a predetermined critical dose or above irrespective of the depth of formation of the heavily hydrogen doped layer, in order to cause the separation, and therefore even for the case where an extremely thin SOI layer is to be formed, an ion dose level equivalent to that used for formation of a relatively thick SOI layer has been adopted.

Thus, conventionally, regardless of formation depth of the hydrogen ion high concentration layer, it has been considered that it is required to implant hydrogen ions greater than a certain critical dosage to achieve separation. Further, Applicants submit that traditionally it has been adopted that even in a case of forming a thin SOI layer, the same degree of implant ions is required as in a case of forming a relatively thick SOI layer. Moreover, Applicants submit that conventionally, the critical dosage to cause separation is constant regardless of the ion implantation depth.

Contrary to the allegations of the Patent Office, Applicants submit that unexpected results were obtained and disclosed in the specification. Applicants found that a smaller amount of a dosage of an ion implantation causes separation with a smaller ion implantation depth. The smaller amount of dosage allows a smaller plane roughness of the separation surface, namely 4.5 nm or less. Therefore, in a case of forming a thin SOI layer, uniformity of layer thickness of the SOI layer is improved. See page 6, line 12 to page 7, line 6 and Fig. 6 of the specification. More specifically, Applicants submit that a smaller energy of ion

implantation, to form a thinner SOI layer, provides greater advantages, such as achieving a separation surface roughness (Rms) of 4.5 nm or less and a uniformity of layer thickness of the SOI layer of 1.5 nm or less. See page 17, line 25 to page 18, line 5 of the specification. Nowhere does Matsui et al. teach or suggest such results.

The results summarized in Fig. 6 of the present application confirm that the critical dose decreases substantially linearly with a decrease in the energy. The specification further describes that:

> It is found that reduction in the ion implantation energy aimed at thinning the SOI layer 5 results in decrease in necessary dose. The roughness Rms of the separation surface is therefore found to be reduced, and the polishing stock removal in the planarization polishing can be set small. The SOI layer obtained under a small set value of the polishing stock removal gives a desirable uniformity in the thickness. If a level of uniformity in the thickness is desired to be suppressed in particular to as small as 1.5 nm or less, the roughness Rms of the separation surface is preferably controlled to as small as 4.5 nm or below. (page 17, lines 10-14 and page 18, lines 1-5)

The results obtained and disclosed by Applicants clearly set forth that as a depth of formation of a separatory implanted layer measured from the ion implantation surface becomes smaller, a dose of an ion implantation required to cause separation is smaller. This correlation and/or relationship between the depth of formation of the separatory implanted layer and the required dose of the ion implantation to cause separation is not taught or suggested by Matsui et al. Matsui et al. further fails to teach or suggest the unexpected surface roughness result of the separation surface as a result of the process. Accordingly, the results obtained by Applicants are unexpected and unobvious in view of the teachings of Matsui et al.

Applicants submit that claim 1 is not prima facie obvious, as alleged by the Patent Office, because Applicants have disclosed that the recited process limitations are required for a particular unobvious purpose and produce an unexpected result. Moreover, Applicants submit that Matsui et al. fails to teach or suggest a method having a separation step that forms

a separation surface of the bonded silicon single crystal film having a roughness (Rms) of 4.5 nm or less so as to produce the SOI layer. Nor does Matsui et al. teach or suggest a process wherein, in the separatory ion implanted layer formation step, a dose of the ion implantation is set smaller as the depth of formation of the separatory ion implanted layer measured from the ion implantation surface becomes smaller as required by claim 1. Therefore, Applicants assert that the teachings of Matsui et al. would not have led one of ordinary skill in the art to the present claims.

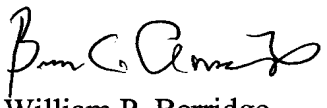
Since Matsui et al. fails to teach or suggest each and every feature as claimed, the claims are patentably distinct over the references. Accordingly, reconsideration and withdrawal of the rejection of the claims under 35 U.S.C. §103(a) are respectfully requested.

III. Conclusion

In view of the foregoing, it is respectfully submitted that this application is in condition for allowance. Favorable reconsideration and prompt allowance of claims 1-8 are earnestly solicited.

Should the Examiner believe that anything further would be desirable in order to place this application in even better condition for allowance, the Examiner is invited to contact the undersigned at the telephone number set forth below.

Respectfully submitted,



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